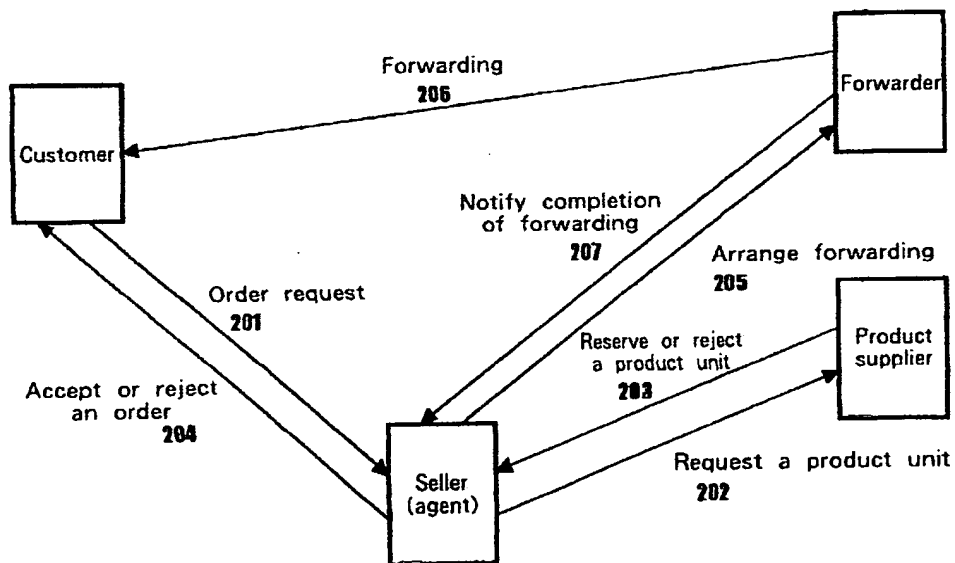


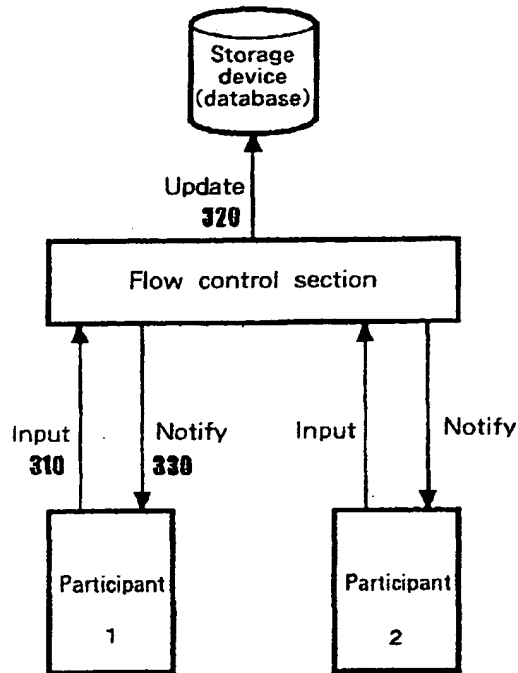
Fig. 1



Typical inter - company workflow

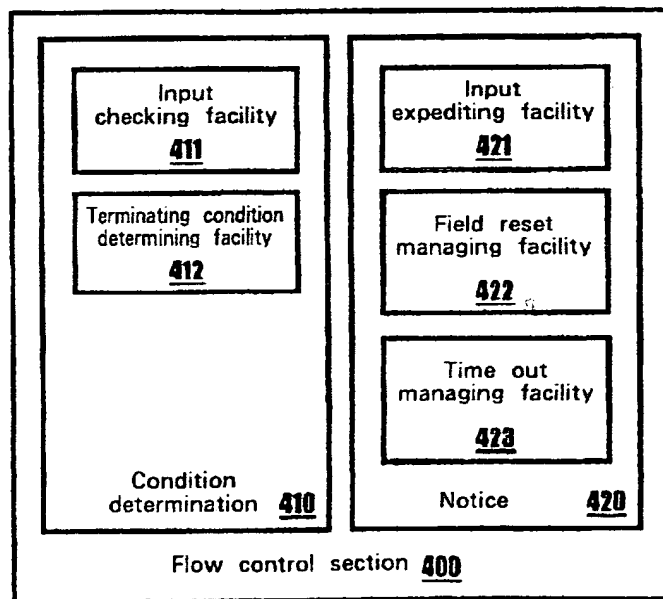
Fig. 2

004224" 0626460



Overview of a workflow controlling system

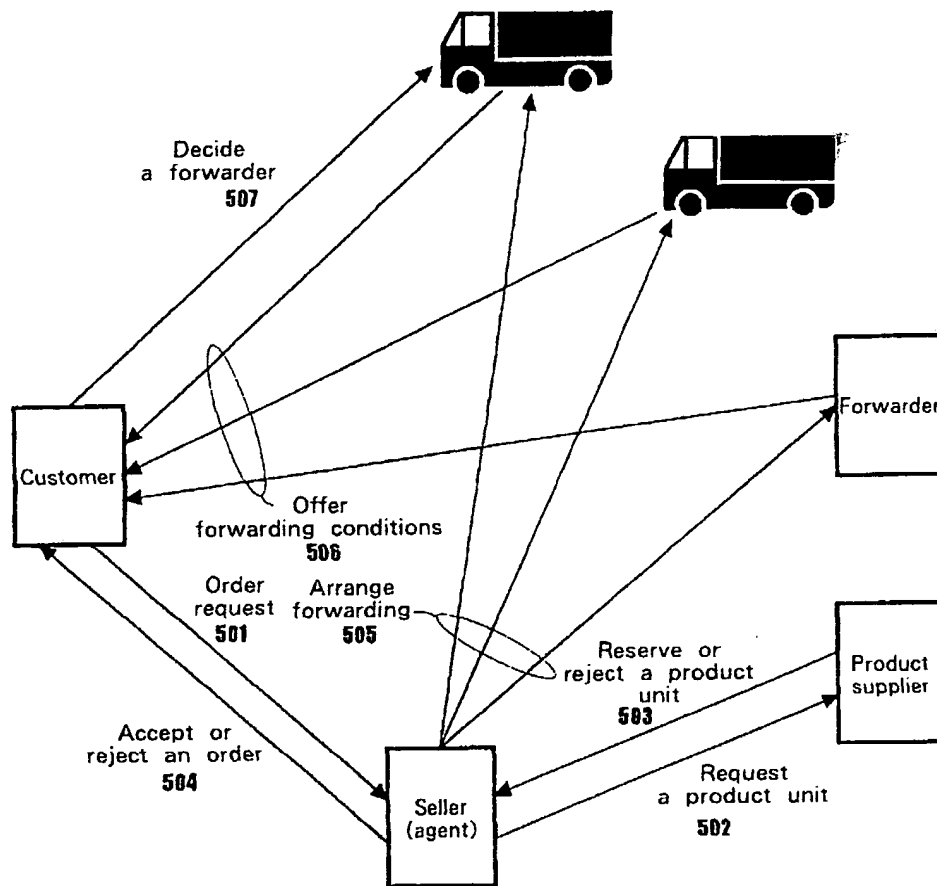
Fig. 3



Structure of a flow control section

Fig. 4

00449230-122700



Workflow including a bid from a forwarder

Fig. 5

Contents
 Tree structure
 (Node, [value])
 History
 (Time, person, action, node ID)
 Access Control
 (Node ID, tag name, person, role, action, conditional expression)
 Constrains
 (Conditional expression)
 Dependencies
 (Depended node ID, Dependent node ID)
 Termination
 (Type, conditional expression)
 Type : End or Abort

[A] means that A is optional

Document data structure

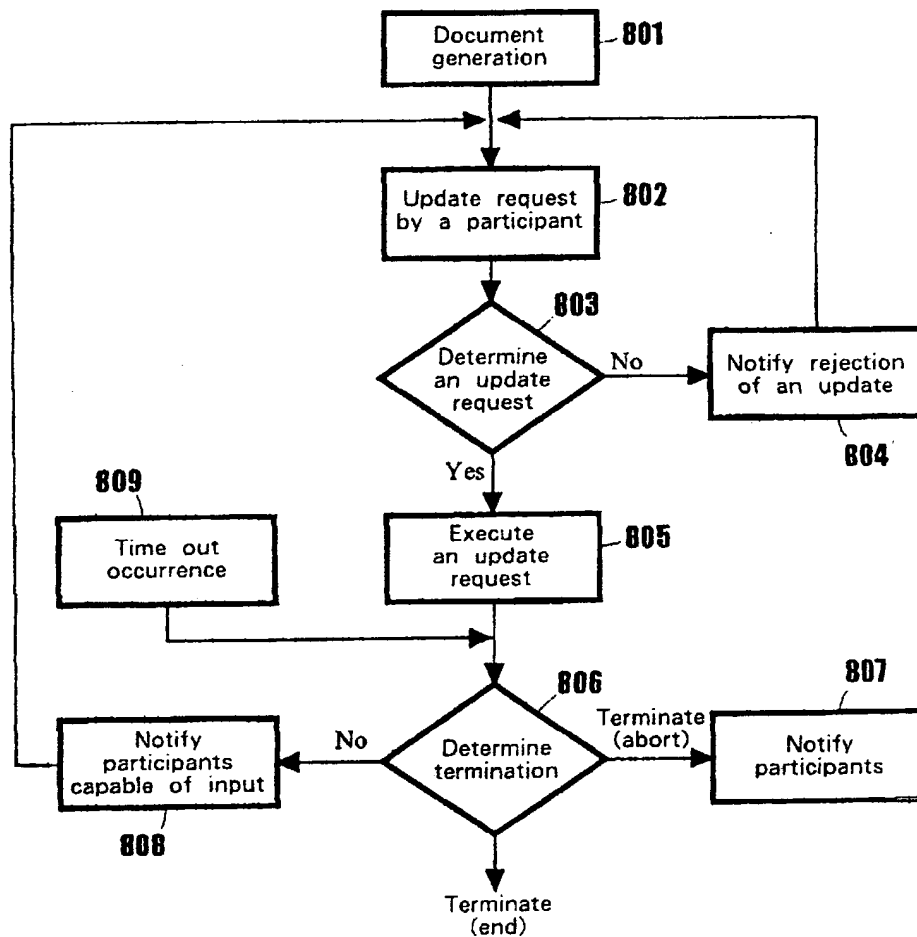
Fig. 6

<p>Contents</p> <p>OrderID= "00001"</p> <p>Consumer</p> <p> ConsumerID= "ConsumerA"</p> <p> Name= "Neyama"</p> <p> Address= "Yamato-shi"</p> <p> Phone= "042-123-4567"</p> <p> DeliveryDateRequested= "21/Sep/1999"</p> <p>Product</p> <p> ProductID= "IBM Aptiva"</p> <p> Price= "99,800 yen"</p> <p> UnitID= "9.116.54.89"</p> <p>Supplier</p> <p> SupplierID= "IBM Corp."</p> <p>Transport</p> <p> Specified= "Kuruneko"</p> <p> Candidate#0= "Pelican"</p> <p> DeliveryDateOffered= "21/Sep/1999"</p> <p> Candidate#1= "Kuruneko"</p> <p> DeliveryDateOffered= "20/Sep/1999"</p> <p> :</p>	<p>History</p> <p>14/Sep/1999:15:20:30,Runtime,w,OrderID</p> <p>14/Sep/1999:15:22:20,Neyama,w,ConsumerID</p> <p> :</p> <p>14/Sep/1999:16:37:10,Pelican,cr,Candidate#0</p> <p>14/Sep/1999:16:37:20,Pelican,w,Candidate#0</p> <p>Access Control</p> <p>value(ConsumerID),w,Specified</p> <p>Transport,cr,Candidate#?,(value(Specified)=nil)</p> <p>Constrains</p> <p>value(DeliveryDateOffer) <= value(DeliveryDateRequested)</p> <p>timeout(isFilled(Specified),isFilled(DeliveryDateRequested),(10))</p> <p>Dependencies</p> <p>ConsumerID, OrderID</p> <p>Candidate#?, DeliveryDateRequested</p> <p>Termination</p> <p>End</p> <p> value(Specified) ! nil</p> <p>Abort</p> <p> ProductID, cr</p> <p> time(Specified, w) > time(DeliveryDateRequested) +</p>
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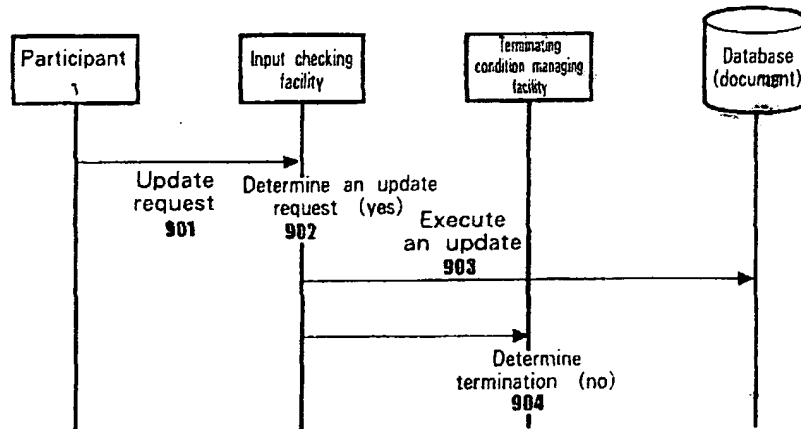
Example of a document

Fig. 7

00449230 1 09264600

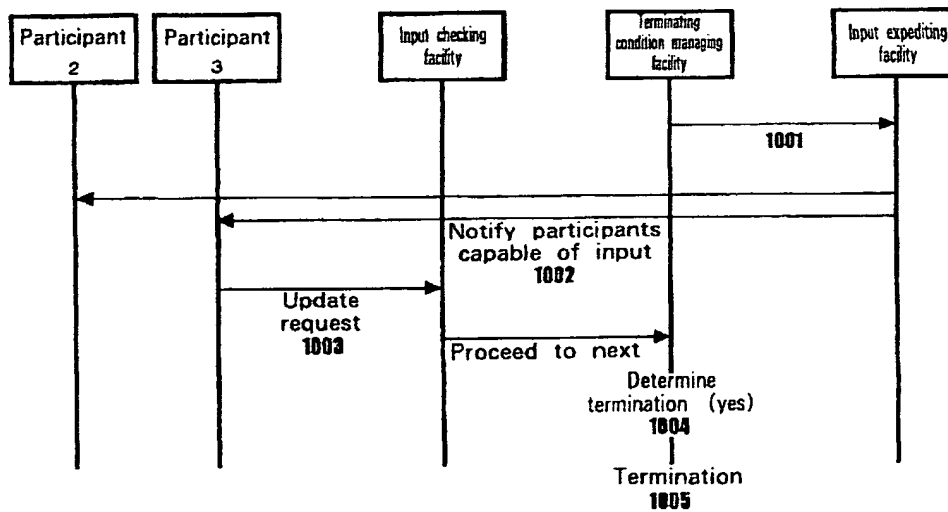


Operation of a flow control section



Processing flow among modules (1)

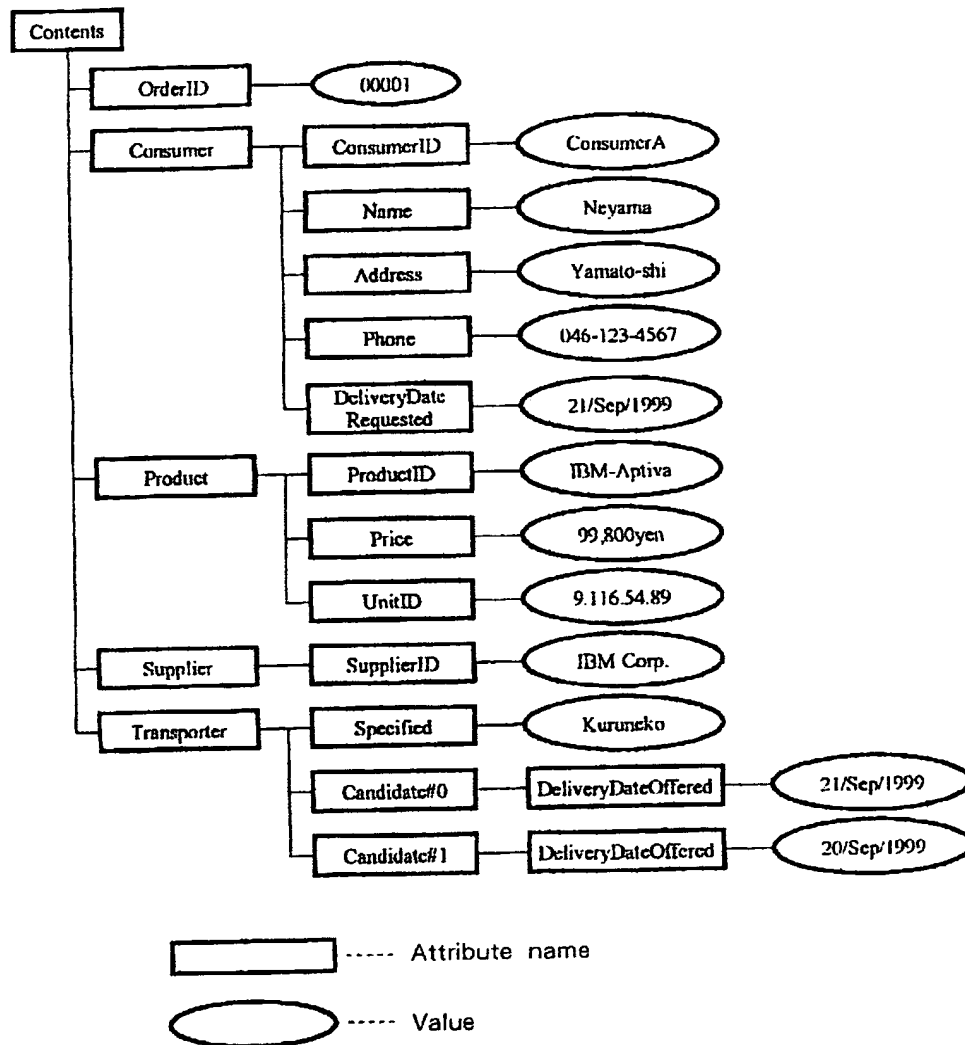
Fig. 9



Processing flow among modules (2)

Fig. 10

004231-00000000



Structure of contents

	Node ID (Attribute name)	Parent node ID (Attribute name)	Value
T0	/	nil	nil
T1	/document	/	nil
T2	/document/contents	/document	nil
T3	/document/contents/OrderID	/document/contents	00001
T4	/document/contents/Consumer	/document/contents	nil
T5	/document/contents/Consumer /ConsumerID	/document/contents /Consumer	Neyama
T6	/document/contents/Consumer /ConsumerID/Name	/document/contents /Consumer	Ryoh Neyama
T7	/document/contents/Consumer /ConsumerID/Address	/document/contents /Consumer	Yamato-shi
T8	/document/contents/Consumer /ConsumerID/Phone	/document/contents /Consumer	046-123-4567

Representation of a tree structure of contents as a table

Fig. 12

Order	Time (sec)	Writer ID	Action	Node ID
0	0	Runtime	Write	/document/contents/OrderID
1	100	Neyama	Write	/document/contents/Consumer/ConsumerID
2	100	Neyama	Write	/document/contents/Consumer/Name
3	100	Neyama	Write	/document/contents/Consumer/Address
4	100	Neyama	Write	/document/contents/Consumer/Phone

(Action types : Create, Write, Read, Cancel)

Example of History representation

Fig. 13

Outline part format

allow(<node>, <user>, <operation>)

Example of rules

Rule 1

allow(?Node, ?User, "+w") ←
 isPath(?Node, "/document") and
 hasRole(?User, "Consumer").

Rule 2

allow(?Node, ?User, "+w") ←
 isPath(?Node, "/ProductID") and
 hasRole(?User, "Consumer") and
 isCreator(?User, ?Node).

Example of Access Control representation

Fig. 14

004930-12200

Constraints 1

Contents : member(TransportSpecified, CompanyID)

Internal representation :

getValue('TransportSpecified',V1) and
 getValueList('CompanyID',V2) and
 member(V1, V2)

Constraints 2

Contents : DeliveryDateOffered <= DeliveryDateRequested

Internal representation :

getValue('DeliveryDateRequested',V1) and
 getValue('DeliveryDateOffered',V2) and
 V1 <= V2

Example of Constraints representation

Fig. 15

Depended node ID	Dependent node ID
ProductID	UnitID
UnitID	TransportInfo
TransportInfo	TransportSpecified

Example of Dependencies representation

Fig. 16

0049230-12200

Example of an end

(1) isFilled('TransportSpecified').

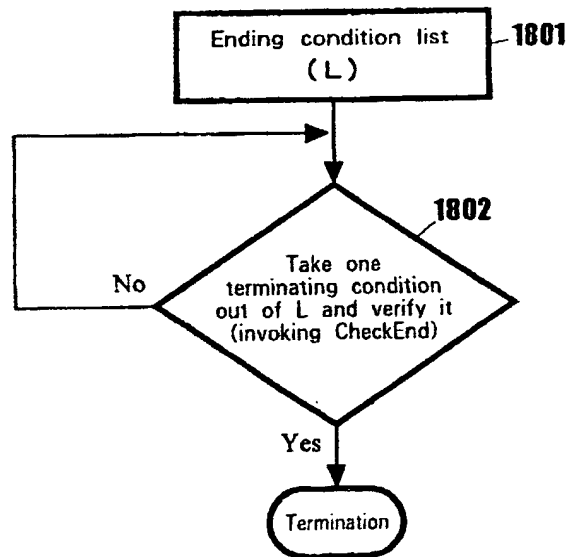
Examples of an abort

(2) isCancelled('ProductID').

(3) timeout(
isSpecified('ProductID'),
isSpecified('TransportSpecified'),
180).

Example of Termination representation

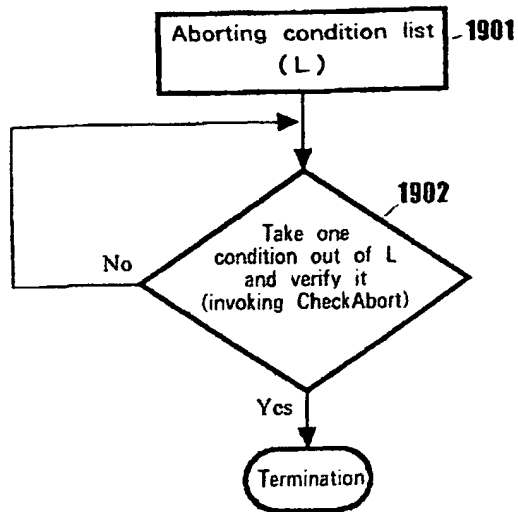
Fig. 17



End determination

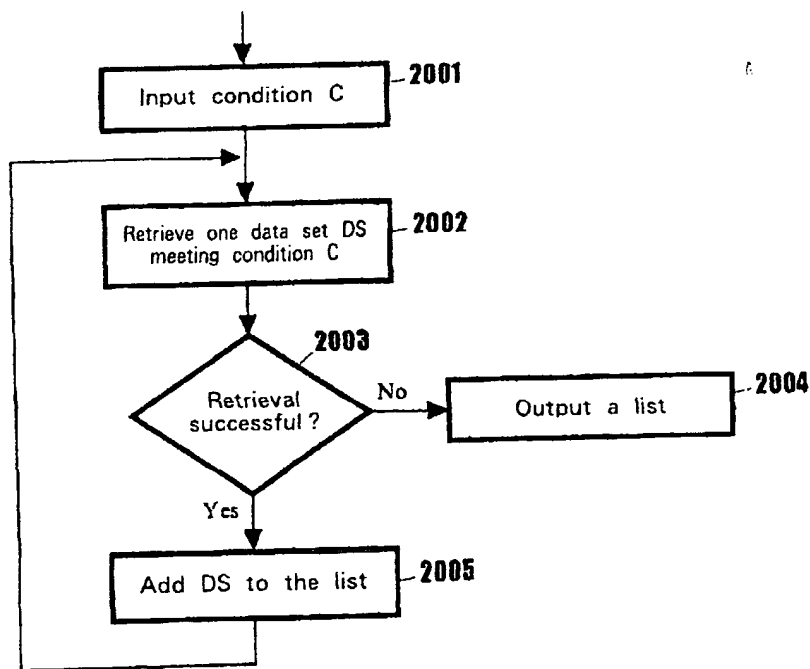
Fig. 18

004227 00000000



Abort determination

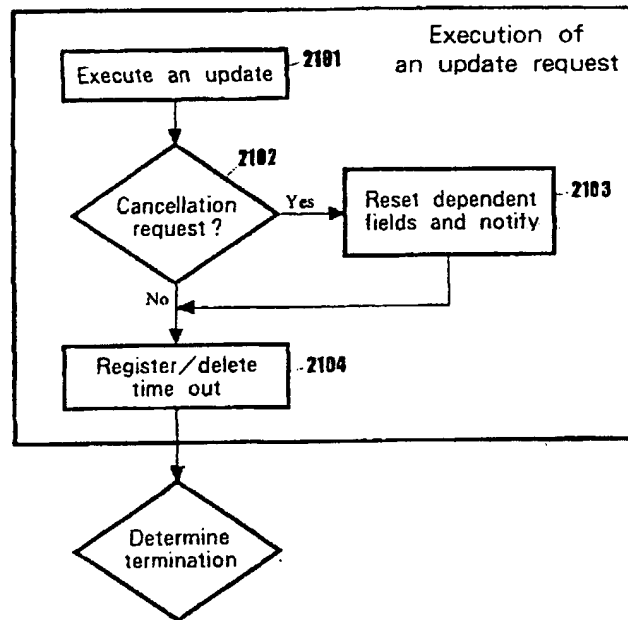
Fig. 19



Processing for finding all elements

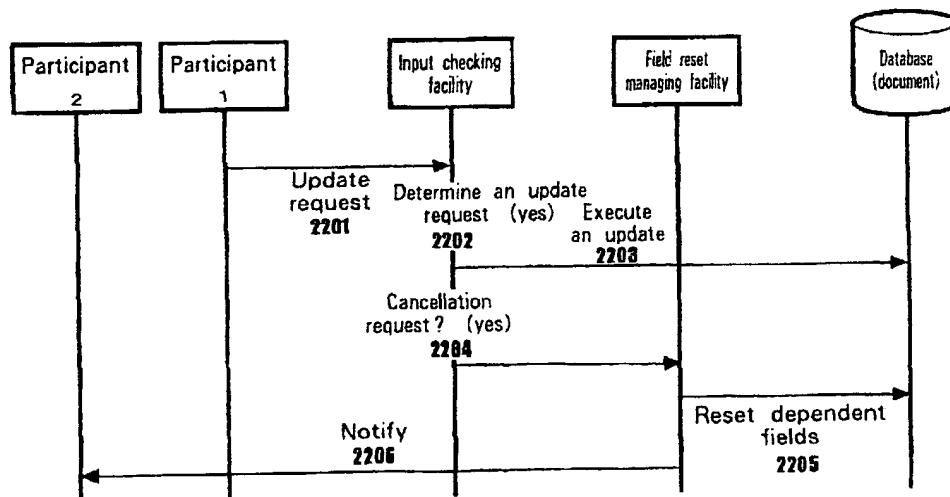
Fig. 20

0049230-12400



Details of execution of an update request

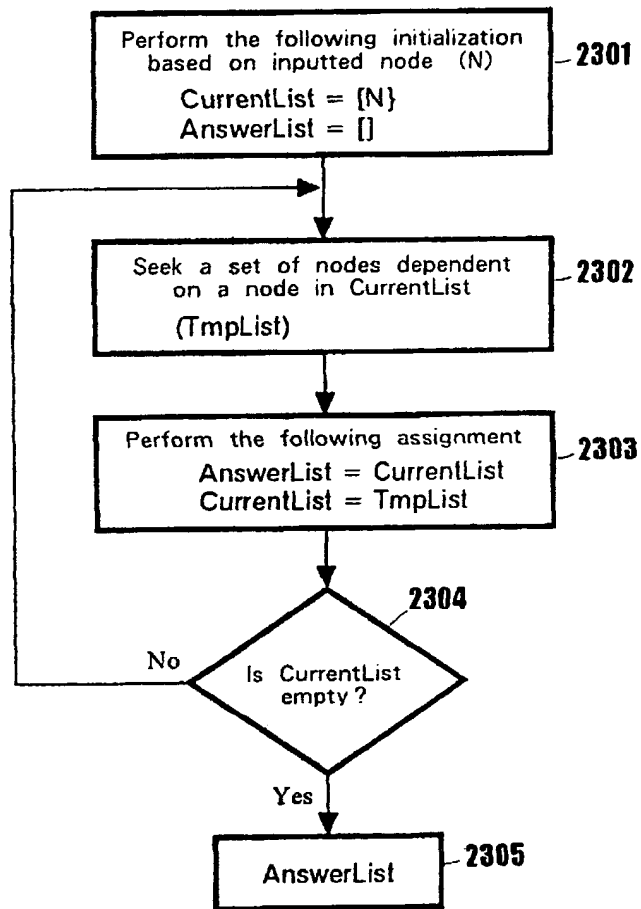
Fig. 21



Details of update processing

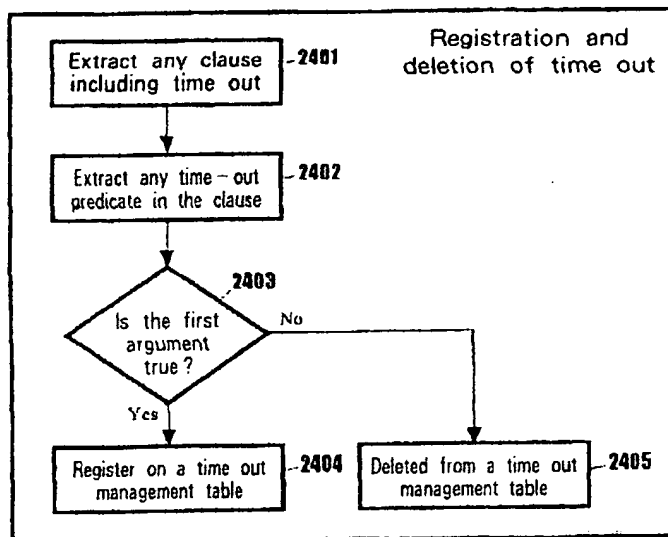
Fig. 22

004227-0226460



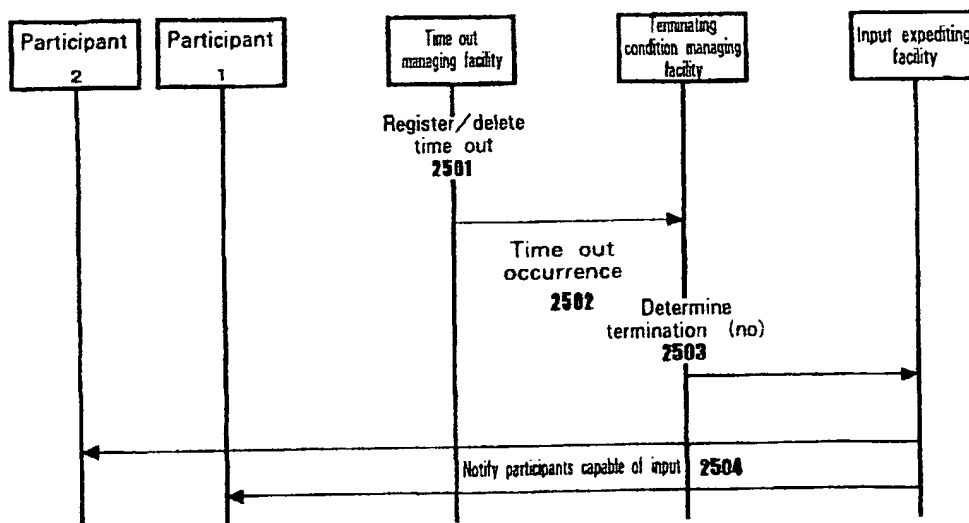
Processing for finding dependent nodes

Fig. 23



Details of registration and deletion of time out

Fig. 24



Processing after time out registration and occurrence

Fig. 25

004237 00000000